



**Readings in  
Sustainable  
Tropical Forest  
Management**

**ESSAYS IN HONOUR OF PROFESSOR LABODE POPOOLA**

Edited by  
**S. Kolade Adeyọju and S. Obafemi Bada**



**F**orest resources are essential to sustaining the biodiversity of natural ecosystems and creating harmony within the world's climate system.

Readings in Sustainable Tropical Forest Management explores the challenges and controversies surrounding climate change, utilisation of forests resources, agroforestry, conservation, the all important issue of Global warming and how these ultimately affect the economy and environment of the African continent.

It is a collection of essays written in clear and lucid prose by scholars who have painstakingly addressed the important issue of the sustainability of forests.

This book will no doubt be of value to all stakeholders involved in the conservation and preservation of Africa's forests, environment and the world at large.

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## FOREST MANAGEMENT AND IMPACT ON THE SOCIOECONOMIC LIVES OF FOREST ENCLAVE DWELLERS AND ADJOINING COMMUNITIES IN EDO STATE

*Samson. O. Ikponmwonba and Ismail. O. Azeez*

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### Introduction

Forests constitute one of the principal renewable natural resources of mankind (FAO, 1985a). They exert a great influence on the lives and fortunes of the rural people and serve as a source of food (Amakiri, 1995). Aimufia (2002) observed from the Holy Bible that the relationship between man and his physical and biotic environment originated from creation. Man's actions, through the use or misuse of forests from time immemorial, have led to the disappearance of a greater proportion of the forests which once occupied the earth's surface. Globally, tropical forests now cover less than a quarter of their areal extent about a century ago (Bruening, 1981). In Nigeria, the situation is alarming with the country losing 398,000 hectares of forests annually (Shami, 2001).

Due to the destruction of forests, they are unable to perform their usual functions of maintaining timber quality, amelioration of climate, watershed and farmland protection and erosion control. Forest management started for various purposes from the pre-literate times. For the early man, forests were like paradise; full of life, providing for his entire daily needs and he tended to protect it.

Popoola (1992) observes that a forest is a source of food and shelter for man, it also exerts profound influence on air and water that are essential to the sustainability of life. Trees and forests influenced people's ways of lives and are in cultures, languages, mythologies and folklores of people living within and around forests (Crew, 2003).

In Nigeria, organization of forests and enactment of the first forest ordinance were considered imperative by the colonial administrators in 1901 and a target of 25% of the country's land area was earmarked for reservation (Lowe, 1986). Enabor (1986) observed that the target reservation could not be achieved because of the widespread stiff resistance of local communities who rightly established their claim to the land. This may explain why the proportion of the country's total land area put under forest reservation in 1976, was 10% out of which only 20% was capable of producing timber (Adeyaju 2001). The lowland's moist forest zones in the country form the productive forests. However, forests outside the reserved areas, which formed about 90% of the total land area of the country, constituted the common property forests where the local communities can harvest trees or farm without restriction. Accordingly, the forest resources in these areas were soon destroyed by the local communities, which then encroached on the reserved land for a more fertile soil for farming. Thus, the support and commitment of rural communities are indispensable in sustaining forest functions. WWF (1996), claims that the knowledge and skills of local people is the possible saviour of the environment.

In the time past, Edo State was one of the very few states in the country that had very rich forest resources and was thus referred to as the "green gold" of Nigeria. The forest was rich in economic timber species, while non-timber forest products and wildlife fauna were abundantly available in all the forest reserves, especially in Okomu, Sakpoba, Ohosu, Ekiadolor and Ehor. Over the years, these rich forest reserves had been subjected to wanton destruction through uncontrolled exploitations. As a result, Garuba (1996) observed that, there is pollution and uncomfortable warmth due to reduction in oxygen and increased carbon-dioxide in the atmosphere



of Edo State. This chapter reports forest management as it impacts the life of dwellers in enclaves and communities surrounding forest reserves in Edo State.

### Forestry in Edo State

Edo State is endowed with enormous forest resources but which are fast dwindling and almost exhausted. Forest resources are a major source of income to government, stakeholders and local communities in which capital can be invested as a foundation for rural industrialization. Majority of the people of the State use forests and depend on the rich forest resources for their livelihood. The State is also blessed with rich agricultural land and varied vegetation with high ecological diversities. The innumerable benefits (timber, fuel wood, medicinal plants, and forest foods, such as seeds, leaves, roots, tuber, and mushrooms) accruing from the forest to the people cannot be quantified.

There is fertile land for farming, as well as wildlife resources, such as bush-meat, on which majority of the local people depend for food, and thus enhance the stability of rural population. In addition, the forests provide materials for local people for such items as mortar and pestle, kitchen spoon, cane for basket, hoes, tool-handles, canoe and energy supply, such as fuel-wood; income generation from sale of forest products such as wood carving and other non-wood products. Tourism and eco-tourism largely focus on forests, for physical relaxation, bird viewing, canopy walks, trees, home and game viewing which can also deliver significant social and economic benefits, thereby adding value to the protection of forest ecosystem (FAO, 2005).

Unmindful of these benefits on human lives, Uzamere (2006) claimed that the forested areas of the State were on the verge of extinction, owing to over-exploitation of wood and non-wood products, bush burning, dereservation and farming activities. These, he concluded, manifest in the destruction of forests, loss of valuable timber trees, flora and fauna, loss of biodiversity, extinction of many traditional plant and animal species for medicine, wind and land erosion,

siltation of rivers, impoverishment of agricultural lands, degraded forest and increasing poverty.

#### **Non-Timber Forest Products (NTFPs) in Edo State**

In most rural settlements in Edo State, NTFPs provide the basic needs of most rural communities. The items serve not only for their subsistence but also as a source of income. They can be grouped into food, household utensils, income generation employment and medicinal categories, depending on their uses. As submitted by Azeke (2002), more than 90% of the rural communities in Edo State are engaged in NTFPs collection and associated industries. Thus, the lives of most rural dwellers in the State are intricately tied to these local industries and crafts (Ikporumwonba, 2008).

Many NTFPs now form part of the rural, cultural and social lives in Edo State as most of the items are used either in the household or in cultural ceremonies/festivals. The roles of forestry craft industries in the lives of the people of the State cannot be overemphasized. For many of them, these are age-long traditions, which are passed from generation to generation, e.g. wood carving in Benin City and mat-making or cloth weaving in Auchi. The products form a strong economic base upon which, the lives of most rural dwellers in the state depend.

The contribution of NTFPs (Table 1) shows that the largest uses of wood are in the small wood-based industries, such as bench mills, fuel wood, canoe, charcoal, chew sticks and poles. This was reposed by Etukudo *et al.* (1994) who submitted that about 95% of the wood consumed in Nigeria is for fuelwood. It is estimated that the financial yields from NTFPs is much higher than that derivable from timber products. For instance, NTFPs (especially poles and rattan) yielded ₦92 million from market estimate in Cross River State in 1992 (Omoluabi, 1994).



Table 1: Identified Forest Benefits in Edo State

Wood products/ particle boards	Non Wood products from forest (NIFP)	Products from forest craft industries	Intangible Benefits (services provided by forest)
Sawn logs, Veneer logs, Pulpwood, Poles, Fuel wood, Match, food, Chewing- sticks, Fencing- sticks, Yam- sticks, Canoe, Mortar & pestles, Furniture, Pulp & paper, Masks, Walking- stick, Char coal	Honey, Wrapping- Leaves, Bush meat, Snail, Fruits, Exudates, Medicinal- plants, Spices, Seeds Nuts, Edible- mushroom, Thatching- grass, Barks, Soil, Forage, Minerals, Dyes, Palm- wine.	Animal products such as Hides & Skin, Leather, slippers, Leather- bags, Leather- shoes, Wallet, Charcoal, Mortar & pestle, Chewing- stick, Canoe, Broom, Sleeping- mats, Tooth- pick, Pencil, Slate, Various carved wooden components, Masks, Walking- sticks, Match-stick, Dyed-cloth, Palm-wine, Local gin, Components, Pulp & paper	Purification of air. Filtration and regulation of water. Soil protection against erosion Protection against wind storm. Protection of water catchment areas or water-shed. Amelioration of weather. Protection of plants and animal against desiccation. Act as wind break against desert encroachment. Protection of wildlife habitat. Source of genetic resource and ecosystem productivity. Beautification. Landscaping. Recreation. Nature tourism and Ecotourism. Help in nutrient cycling and improve soil fertility. Assist in hydrological cycle.

Source: Ikponmwonba, 2008

In Edo State, forests provide food and condiments, which many people consume and sell for income. The forest foods are found in most villages across the state. These food items are consumed mostly

during the lean periods before new crops are harvested. More than 60% of the rural dwellers in the State are engaged in the collection and processing of forest foods (Ikponmwonba, 2008).

The importance of these foods to the lives of the people is attested to by the naming of some settlements/villages based on certain associated forest foods. For instance, Ugbogui town in Ovia South-West Local Government Area derives its name from *Irvingia gabonensis* (Bini-Ogui) due to the abundance of this product in the area. Some of the abundant forest foods in the state include edible fruits of economic importance, such as *Irvingia gabonensis* (Bush mango), *Chrysophyllum albidum* (African star apple), *Dacryodes edulis* (African pear), *Elaies guineensis* (oil palm), *Dennettia tripetala* (pepper fruit) and *Spondias mombin*. Others include *Pentaclethra macropylla* (African oil bean), *Garcinia kola* (bitter kola), *Cola accuminata* and *C. nitida*, *Treculia africana* (African bread fruit), *Blighia sapida* and *Tetracarpidium conophorum* (African walnut).

Most of these forest foods serve as delicacies even to urban dwellers. It is not uncommon to see vehicles parked along the highways in the state to purchase some of these forest foods. But the decline of these forests has negatively affected the supply substantially. The need to conserve these forest resources for the sustenance of rural populations is very important. This calls for an effective approach to the management of state forest resources to enhance sustainability.

Other very important non-timber forest products in the State are the natural medicines from the forest. Most rural dwellers in the state rely on herbal medicine. Majority of the rural and urban poor dwellers take to herbal medicine because orthodox medicine is often expensive and not readily available. In China, traditional medicine has been integrated into the modern medical health care programme. There is need to do the same in Nigeria, as this will go a long way in improving health care delivery to rural dwellers.

### **Forest Exploitation**

Forest exploitation activities are a part of the bedrock of Edo State economy. As observed by Poore (1976), adequate habitat



conservation should be the yardstick for the preservation of high forest ecosystem, which is characteristic of Edo State. Such conservation should follow a management plan to ensure sustained existence of high forest plants and animals as well as the sustenance of human life. Contrary to this, exploitation has assumed an alarming dimension in recent years, with untold effects on the lives of the people, economy and the environment of Edo State. At present, about 280 sawmill units, over 1000 bench-mills and planting machines, 159 registered timber contractors and 582 timber lorries are operating in the State and are all dependent on the State's forest resources. Apart from this legal exploitation, there is illegal felling of trees, which is now elevated to criminal status, as log thieves are heavily armed and operating mostly at night.

In addition, apart from the legitimate exploitation of round logs by contractors that are issued, compartment or relics area allocation papers, there is a form of exploitation, which involves felling and sawing of trees at stump site with power chain saws. The fitches so derived are transported by human porters to the nearest road-side for easy conveyance. Although this practice is prohibited in the State, it is rampant and usually employed by illegal fellers.

Consequently, forest exploitation in Edo State has become an all comer's affairs with politicians dictating the tune and organizing exploitation and patrol activities. This has aggravated the problems associated with forest exploitation. The rate of exploitation has tripled recently, leading to rapid depletion of the State forest resources. This has tremendous implications for biodiversity conservation in the State. Lecomber (1975) opines that uncontrolled forest exploitation leads to the extinction of animals and plants whose genetic resources are of considerable value to man.

### **Forest Management**

Forest management is the deliberate application of a system of management into the conservation, nurturing, harvesting and renewal of forest resources. It is essential for providing sustainable flow of forest resources to industries or other consumers. Without management, forest resources will be completely depleted.

frequent or repeated cultivation of the same portion of land for arable crops without forest tree seedlings. Arising from these frequent allocations, all the remaining high forests in the state forest reserves have been repeatedly allocated and now devoid of sizeable timber trees. By 2010, the old classical approach to forest management based on sustained yield principle with emphasis on forest, trees and conservation, which is practiced in the state, has completely broken down giving way to no definite system of management.

### Forest Regeneration

The process of replanting valuable timber trees in forest reserves in order to provide timber in perpetuity under adequate management practices is forest regeneration. By 1992, forest regeneration, wild life conservation and special services became a division in the State. The division is responsible for the execution and co-ordination of the state forest regeneration/afforestation programme, which includes nurseries, seed orchards and plantation establishments as well as procurement of adequate seed stock. However, critical shortages of technical staff, materials and inadequate funding have stalled most siccultural operations in the State. At present, forest exploitation has almost exhausted the whole merchantable trees in the forest estate, while regeneration is minimal or nonexistent.

*Taungya* system of forest regeneration is the main form of afforestation practised in the state. This *taungya* system of farming started in the State as far back as 1926. It is a system of raising forest crops in combination with arable crops. It is a form of quasi-multiple land-use because the agricultural crops do not generally continue throughout the rotation of the forest crop, but are confined to that period which ends with the closure of canopy of forest crops, usually 2 - 3 years (King, 1968). The advantages at the inception are that the cost of site preparation (felling, brushing, burning, loaping and packing of debris), which is carried out by *taungya* farmers, is saved for government.

This system was beset by numerous problems and first assessed to have failed in 1973 due to:



**a) Encroachment, Inadequate funding and Lack of manpower**

There was an influx of farmers into forest reserves, from both rural and urban areas and so more areas were opened-up for planting. On two occasions, 1973 and 1984, government attempted to ban the system in the then Bendel State but succumbed to pressures from farmers, as the matter became politicized. When absolute ban was not possible, government placed a ban on high forest farming from 1983/84 farming season. Today, the destructive farming in the high forest continues unabated and the effect on areas encroached upon is enormous in spite of arrest and prosecution of offenders. The local communities are adamant because of the abundant yield of plantains and other crops in the high forest. They also take advantage of the weak forest protection fabric engendered by critical shortage of staff and poor logistics.

A large number of farmers encroached on the State's forest reserves for farming during the economic recession of the Structural Adjustment Programme (SAP). These people needed to feed due to the harsh economic situation in the country at the time. Thus, the surplus farmers that could not be accommodated as *taungya* farmers encroached on the forest reserves. Also in this group were those that disguised as *taungya* farmers that had been banned from farming in the high forest. They deliberately encroached on the high forests because of the high yield of harvest, especially from plantain cultivation. A more serious threat was from the native settlers farming in the high forest, as they asserted ownership of the reserves.

The *taungya* farming system, even though known to have failed, is still being referred to as the method of regeneration in the State. There is no definite system of practice, no definite size, or areas earmarked for each year's farming practice, and more importantly, no planting of tree seedlings. The ad-hoc nature of the system today cannot lead to any meaningful regeneration. The patches of areas opened up are scattered across the different forest reserves for a particular year and are not contiguous.

The total area earmarked for annual planting is usually less than 40 hectares, compared with about 1000 hectares farmed annually by *taungya* farmers across the State. Apart from the money realized from the partnership in 2004 and 2005, no fund has been released for

regeneration activities in the State for the past ten years. This is in addition to inadequate manpower, logistics and inputs. The system therefore destroys the forest more than any other means of encroachment. There is therefore need for dialogue with the native settlers, the original owners of the forests to check or control this deliberate encroachment into high forests for farming.

#### b.) Private Sector Participation in Forest Regeneration

It was the desire of the then Bendel State Government to encourage private sector participation in forest regeneration when it allocated different portions of the forest reserves to Messrs A T & P (Nig) Ltd Sapele, Iyayi Group of Companies, Benin City; Piedmont Plywood (Nig) Ltd, Ologbo and A.I.W Morgan, Benin City to pursue their regeneration programmes. Apart from the Iyayi Group, all other companies' regeneration activities have long ceased to exist.

However, the Edo State Government in 2004 formed partnerships with stakeholders, Edo State Timber Management Committee and Edo State Sawmillers Association, to source for funds for nursery and plantation developments. The agreement, which was for two years in the first instance, resulted in members of the Sawmillers Association agreeing to contribute ₦15,000 (fifteen thousand naira) each and ₦20,000 (twenty thousand naira) per licence to the Forest Regeneration Fund yearly. From these contributions, ₦5, 000 from each donor goes to the Sawmillers Association's account. A total amount of ₦3, 555,000.00 (Three million, five hundred and fifty-five naira) was realized by government, while ₦930, 000 and ₦565, 000 went to the sawmillers and timber licences respectively for each year.

The projects, which were executed in 2004 from the fund, are shown in Table 2. In addition, the sawmillers established 200,000 nursery seedlings at Ologbo in 2005 and a 9-seater bus for regeneration activities was donated to the Forestry Department. Earlier on in 2003, the Timber Management Committee established a 12 ha mixed indigenous species of mostly *Meliaceae*, *Terminalia ivorensis* and *Nauclea diderrichii*, at Ehor Forest Reserve from the Association Fund.



Table 2: Plantation Establishment in 2004

NO	Local Govt. Area	Area Proposed to be Planted	Area Actually Planted	Species Planted	No. of Seedlings
1.	Orhionmwon	(i) 4ha ceremonial plantation  (ii) 4ha Taungya plantation	4Ha 4Ha	(i) Teak (ii) Teak	8,000 8,000
2.	Ikpoba-Okha	4ha Taungya plantation	5Ha	Gmelina	10,000
3.	Uhunmwonde	12ha Taungya plantation	16Ha	Gmelina	32,000
4.	Esan West	6ha Taungya plantation	6Ha	Gmelina	12,000
5.	Ovia North	4ha Taungya plantation	4Ha	Teak	8,000
6.	Total	34ha (85 acres)	39Ha (97.5 ac)		98,000

Source: Edo State Department of Forestry (2007)

#### Dereservation of Forest for Various Uses

Large-scale dereservation of the State forest reserves by government has taken place over the years, for commercial agriculture, oil exploration, oil-palm and rubber plantation development, urbanization, grazing and community expansion. This has reduced substantially, not only the size of forest estates but also the richness of the ecology to about 13%, leading to loss of biodiversity and destruction of the ecosystem. Apart from loss of timber species, the non-timber forest products, other tangible benefits derivable from the forest mostly by the local communities are destroyed. Etukudo (2000) referred to these as biological materials (other than industrial round-wood and derived sawn-timber, wood-chips, wood-based panels and pulp-wood) that may be extracted from the forest ecosystem and are utilized within the household or are marketed.

Dereservation has taken place in almost all the forest reserves across the state. Arising from incessant de-reservation requests, the State

Government in 1994 promulgated an edict – “Edict No. 13, on forest utilisation and development” which states that: “De-reservation for commercial purposes is prohibited”. However, this could not be sustained as pressure on dereservation continued to increase. As at 2002, about 133, 234 hectares or 23% of the state forest estate had been dereserved. Between 2002 and 2004, a further 6% (34,343 ha) was ceded mainly for agriculture. Furthermore, in 2006, another 4% was ceded, apart from other outright encroachments, leaving an estimated 13% of the state’s land area under forest estate.

The situation is such that the actual area currently under forest reserve is unknown. In some instances, more than three-quarters of the entire forest reserve has been ceded to oil palm plantation. The Obaretin Forest Reserve, for instance, which was constituted by Benin Native Authority’s Order 26 of 1935 with 10,800 hectares, is almost completely concessioned to Presco Oil-Palm Plc for oil palm plantation development. Prior to dereservation, this reserve housed *Terminalia ivorensis* and *Nauclea diderrichii* plantations of more than 1000 hectares. These were bulldozed for oil-palm establishment, thereby changing the entire natural ecosystem to that of monoculture plantation.

Thus, dereservation has resulted in the disappearance of not only timber species but many more forest food species harvested from the wild that have not been domesticated. Lusigi (1991) reported that deforestation does not only affect the productive potential of plants but may also result in species extinction and loss of habitat. The greatest threat to the conservation of forest and forest resources in the country today is loss of habitat and ineffective laws to protect the forests. Osemeobo (1993) stated that weak laws encourage misuse and abuse of forest resources, as government alone takes decisions on forestry matters. Most of these dereservations carried out by the state government are without the consent of the local inhabitants, the original owners of the reserves. Enforcement of a federal legislation against dereservation may help curtail this reckless abuse on the environment.

### **Encroachment**

Encroachment may be defined as the deliberate entering into a forest reserve for other forms of land use practices outside that which the



forest was set up, without permission from the appropriate authority. The purpose of encroachment in the state includes, but not limited to, arable and commercial farming, rural and urban expansion, highway construction, oil-exploration and grazing. Iftekhhar and Hoque (2005) defines encroachment as illegal entering into a constituted or protected forest to cause damage, thereby contravening some or all the provisions of certain sections of the forest law of the country.

The history of encroachment into Edo State forest reserves is as old as the reserves themselves. Encroachment was first noticed when the reserve boundary pillars were tampered with. This offence was however minimal because reserve boundaries were then maintained. Actual encroachment started when the reserves' boundaries were no longer maintained. Thus, causes of encroachment into forest reserves, according to Adetula (2001), include non-maintenance of forest reserve boundaries, non-availability of signposts, granting of too many rights during constitution of forest reserves, activities of enclave settlers, customary tenure, inadequate monitoring of taungya farms and land hunger. In addition, population growth, unemployment, lack of management planning, and lack of effective policy and legislation to deal with land offenders are factors responsible for encroachment.

Generally, encroachment has adverse effects on the lives of people and the environment, as it causes land and soil degradation, destruction of watershed/catchment areas, drying of streams, destruction of habitat of flora and fauna. A typical example is the destruction of Ogba River and its catchment area, which formerly supplied water to 1/3 of the population of Benin City, Edo State. Iftekhhar and Hoque (2001) suggests the following, amongst others, as solutions to encroachment of forest reserves:

- a) Re-surveying the remaining forest reserves and erecting numbered beacons. Also calculating the land areas lost to encroachment/dereservation.
- b) Demarcating forest reserves and producing up-to-date maps of the reserves.
- c) Strengthening and protecting patrol staff with adequate manpower, materials and equipment.

- d) Improving forest departments' discipline and efficiency.
- e) Reviewing forest lands and policy of the country in line with modern international thinking.
- f) Planting up areas already encroached upon as well as those under encroachment threat.
- g) Preparing management plans to ensure sustained and improved yields, conducting public education and obtaining cooperation of law enforcement agents.

### Forestry and Rural Development

In most developing countries, forestry activities are associated with rural areas where there is a lack of basic amenities, such as potable water, good roads, electricity, health care, schools, etc. In his study, Ikponmwonba (2008) identified the most needed social amenities among residents of some forest enclaves and surrounding communities in Edo State (Table 3) as good road (24.4%), pipe-borne water (21.9%), secondary schools (21.5%) and hospitals/dispensaries (18.6%). Non-available social amenities identified by the same study (Table 3) included secondary schools (19.0%), good roads (19.3%), hospital/dispensary (18.2%), pipe-borne water (16.2%) and electricity (16.2%). These underscore the need to enlist community participation in forest management, which is the present global trend, to ensure that the needs of rural dwellers (social and infrastructural) are met within their whims.

According to Olawoye (1996), Community Forestry (CF) was initiated to integrate forestry and community development, with the view to involving rural people in forest management. As submitted by FAO (2003), economic development is one of the best ways to improve rural community's welfare and lessen the considerable disadvantages they suffer. In Nigeria, rural people are highly neglected and considered as destroyers of environment rather than a factor in the solution to achieving sustainable forest management.

In most rural settings, good health is not guaranteed due to the poor quality of drinking water and absence of health centres. As forestry is mostly rural-based, with activities such as agro-forestry, farm forestry, taungya farming and cottage industries, it has been identified as a veritable tool for rural development.



Table 3: Status of Social Amenities in Some Forest Reserves' Enclaves and Surrounding Communities in Edo State

	Okomu Freq. %	Sakpoba Freq. %	Ehor Freq. %	Mean Freq. %			
<b>Most needed social amenities</b>							
Primary Schools	11	1.66	-	2	0.88	4	1.43
Hospitals/Dispensaries	78	11.75	33	23.24	45	19.74	18.64
Pipe borne Water	111	16.72	18	12.68	54	23.68	21.86
Electricity	20	3.01	14	9.86	13	5.70	5.73
Secondary Schools	102	15.36	36	25.35	41	17.98	21.51
Good Roads	109	16.42	35	24.65	60	26.32	24.37
Markets	19	2.86	5	3.52	2	0.88	3.23
No Response	14	2.11	1	0.70	11	4.82	3.23
<b>Unavailable Social Amenities</b>							
Primary Schools	28	4.13	1	0.56	8	2.73	3.13
Hospital/Dispensary	117	17.26	36	20.23	56	19.11	18.23
Pipe borne Water	122	17.99	23	12.92	41	13.99	16.15
Electricity	106	15.63	33	18.54	48	16.38	16.15
Secondary Schools	123	18.14	38	21.35	57	19.45	19.01
Good Road	125	18.44	36	20.22	60	20.48	19.27
Market	37	5.46	9	5.06	10	3.41	4.95
No Response	20	2.95	2	1.12	13	4.44	3.13

Source: Ikponmwonba (2008)

The areas of transfer of development to rural areas according to Etukudo *et al.* (1994), are:

- Development of roads and the attraction of other infrastructure to rural areas.
- Stabilization of rural communities through the provision of local employment opportunities.
- Encouraging socioeconomic development.
- Development of forest villages.

### **Development of Rural Roads**

Forestry operations such as timber exploitation, afforestation and establishment of wood-based industries led to the opening of roads to many rural settlements and urban areas. In Edo State, these roads became the main access roads to many villages and even outside the state. For example, Ogharefe, Igbakele – Sakponba – Ugo road, Benin – Idu waterside – Iguomokhua – Sakponba road, Abraka – Evboesi – Ugo road, Nikrowa – Udo – Benin road, Benin-Ehor-Auchi road, are among the prominent rural roads which were developed from forest extraction and evacuation routes. Apart from local and state roads, the Lagos – Ijebu-Ode – Ore – Benin express way was developed from a former forestry extraction route. In this process, many rural communities were linked and served as important economic routes for evacuation of farm produce and linkages to bigger cities. Among the prominent timber industries that developed roads to rural communities are African Timber and Plywood Limited (AT&P) Sapele, Nigerian Hardwood Company based at Obiaruku in Delta State and the Northern Nigeria Timber Company, in Okura, Lafia, Kogi State, and lately, Iyayi Brothers Nigeria Ltd, Egba, Edo State. Many other wood-based industries also contributed immensely to the development of rural roads across the country.

### **Stabilization of Rural Communities**

The presence of many wood-based industries helps to stabilize rural populations, mostly by curbing the movement of youths to urban areas. The provision of employment opportunities to most rural men and women through such activities as timber exploitation, afforestation, seed collection and nursery development led to the growth and sustenance of rural populations. Examples of such employment generation companies are African Timber and Plywood Ltd, Sapele, Nigeria Hardwood Ltd, Obiaruku, Piedmont Plywood Plc, Ologbo and Iyayi Brothers Nigeria Ltd, Egba. Apart from those directly engaged by these industries, some took to small-scale businesses, such as trading in food items and NTFPs and farming.

### **Encouraging Socio-Economic Development**

Forestry and wood-based enterprises create employment opportunities for most rural dwellers. Economic development is one of the best ways to improve a community's welfare and lessen the



considerable disadvantages they suffer (FAO, 2003). Many workers are engaged in the industries, afforestation, exploitation, rural road construction and maintenance projects. The income realised from such gainful employment helps to raise the economic status of the rural communities. Apart from this, people invest part of their income in other ventures such as trading for their wives, and thus contribute to rural development.

In addition to the roles of forestry and wood-based industries in rural development, there is the provision of self-employment in the areas of non-timber forest products. For example, fuel-wood and charcoal form the main sources of energy for cooking and heating in the rural communities, hence the demand for fuel-wood is ever on the increase. Most people in the rural communities cannot afford alternative sources of energy; they therefore rely on fuel wood. FAO (1985b) states that alternative energy sources are either too costly or not available. According to Papka (1997), the annual fuel-wood consumption in Nigeria stands at 70 million m<sup>3</sup> and this accounts for well over 90% of the total annual wood production in the country (NEST, 1991). This does not deviate sharply from the approximately 200 million people the world over, mostly the rural people and urban poor, who depend on fuel wood as their main source of energy for cooking and warmth (FAO, *op. cit.*).

Charcoal is also used in rural areas. It is used in heating box irons for ironing clothes, cooking, roasting of foods such as maize, yam and plantain and for heating houses during cold periods. Quite a number of rural populations, especially women, are engaged in firewood collection for household needs and to earn an income.

Other areas where forestry provides self-employment for rural populations are in hunting, which is a traditional occupation of most rural men in Edo State. It is estimated that more than 60% of meat consumed in rural areas in the State comes from bush meat. Other NTFPs such as chewing sticks, carvings, mortar and pestle production, cane and mat weaving, wine tapping, snail collection and fruit gathering are among important self-employment opportunities offered by forests to rural communities. Thus, the uses

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of these forest products will continue to increase, and in the process, generate more income for the rural communities. Although forestry still has the potential to contribute more to the livelihood of rural communities, there is the need for judicious exploitation of forest resources. These resources are being depleted without replacement. Hence, if sustainability is desired, there is the need to promote and set-up cottage industries to utilise forest products as raw materials in order to generate more income and contribute to rural development.

#### Development of Forest Villages

Many governments and wood-based industries provided residential quarters for their staff. This led to the creation of forest villages in several states of Nigeria. The rural communities in parts of Edo State whose growth and expansion were linked to forest enterprises include Sakponba, Ona, Iguomokhua, Evbarhue, Ugo, Obozogbe, Iguelaba, Udo, Iguobazuwa, Siluko, Nikrowa and Okomu. Some of these settlements have now grown into towns.

#### Conclusion

Sustainable forest management is an important tool for the development of rural economics, but the present state in Edo State leaves much to be desired. The State must take policing of the remaining resources very seriously by creating enabling policies and environment for sustainable management of its forest estates and make overtures at reforestation of the degraded forests. Also worthy of note is that sustainable development is people-oriented; therefore, charting a way forward for sustainable forest management in Edo State should involve the rural people whose livelihood hinges on resources from the forest estates.

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